Chapter 6

The International Environment for Financial Services

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Introduction

The economies of the world have become increasingly interdependent trading economies. The financial service industry supports these activities by providing the means to transfer payment for goods and services purchased internationally and by acting as an intermediary between those nations with excess funds and those in need of funds. As the economies of individual nations become more intertwined, the role of the financial service industry becomes more important to the world economy.

Changes are taking place in the structure of financial markets as well as the structure of the industry and its participants. Communication and information technologies have helped to make markets that were once local or regional in character, global. Funds travel across national boundaries with such ease that disequilibrium is offset. This flow of funds became increasingly evident in the 1970's with the excess capital available from oil-rich nations.

Separate from, but related to, changes in financial markets are the structural changes taking place in the industry itself. During the rise of multinational corporate activity in the 1960's and 1970's, banks moved abroad to follow corporate customers. In addition, banks found that in order to insure access to many of the foreign money markets, it was necessary that they establish a presence, either through a branch or an affiliate. A final reason for multinational branching by U.S. banks, was that regulation, taxation, and supervision of institutions in other nations was more often favorable to the conduct of their business.

In the past 20 years there has also been a number of new entrants in the field. Smaller banks have been able to participate in international finance through the use of innovative lending arrangements. Nonbank financial service providers have developed large, international networks to facilitate retail flows. SWIFT (Society for Worldwide Interbank Financial Telecommunication), a network established by the banking community to facilitate international interbank transfers, is on the verge of offering traditional bank services, perhaps in direct competition with its founders.

These relationships rely heavily on both the flow of information and the international transfer of funds. Information technologies therefore found early application in the international financial arena, beginning with the telegraph. It is difficult to assess and identify the individual impacts of the technologies on this segment of financial service activities, since the use of the technology is so prevalent. In many ways much of the activity in the international financial markets could not occur without the technology.

The Growth of International Banking

Post-World War II developments in capital movement and the restructuring of the foreign exchange system helped foster trade, which in turn expanded the role of the private banking community to support these trade flows. Moreover, the development of multinational

corporate activity expanded the need for financial services connected with direct investment operations and established new requirements for the conduct of multinational business.

At first, international financial activities expanded in traditional ways: through the exchange markets and accepted ways of international lending. Eventually, the movement to increased internationalization of financial activity was supported by changes in bank strategy and management and by institutional and structural changes in international money and credit markets.

By all counts the growth of international banking has been phenomenal. The Organization for Economic Cooperation and Development (OECD) has compiled figures on the growth of international banking in developed nations over the last two decades. Although there is no comprehensive measurement for world banking activity, and many measurements of this activity include double-counting and inflated figures, the gross figures and the net figures (which should eliminate the double-counting) are strikingly similar. In the period from 1975 to 1981, net international bank lending increased by an average annual rate of 23.9 percent, while the net size of the eurocurrency market* increased by 21.6 percent. Although the figures for this period show considerable growth, the eurocurrency markets experienced their greatest growth from 1965 to 1970, when average annual changes were 37.7 percent.[1]

Similar statistics illustrating the relative importance of foreign business of banks show that the average growth of foreign business for OECD banks as a whole has been from 12.1 percent of assets in 1970 to 23.7 percent of assets in 1981, and from 11.3 percent of liabilities in 1970 to 23.4 percent of liabilities in 1981.[2]

R. M. Pecchioli, in a recent OECD report, attributes the evolution of international banking's structural features to a number of factors: changes in the international economic and financial environment, the evolution of demands for financial services by borrowers and investors alike, and the spreading of technological facilities.[3] The events of the 1960's were, for the most part, the result of the gradual recovery of the world economy from the devastation of war, and the liberalization of trade. The 1970's, however, brought major structural changes to the world economy; world payments balances became more severe, and there were major structural changes in the international payment and financial systems, all of which gave banks a pivotal role in international financial intermediation.[4]

New Directions in International Banking

It is impossible in this report to provide a comprehensive survey of all the changes in international banking techniques; rather, important product innovations will be highlighted, along with the entry into new markets.

Sources of International Funding

International banking strategy does not generally distinguish between domestic and international funding, since, for the most part, banks will follow an overall assets and liabilities management policy. Two major sources of funding in the international market are the certificate of deposit (CD) and the floating rate note (FRN). CDs are negotiable receipts for large deposits; they have been used in the United States for many years and in the Eurodollar market since 1967.[5] London is, by far, the leading center for CDs. In 1981, foreign currency CDs issued by London banks totaled more than U.S. $75 billion, most of which was actually denominated in dollars.[6] FRNs, which are borrowing instruments used by banks,

*A eurocurrency is a deposit account at a European bank denominated in a currency other than that of the host bank.

[1] R. M. Pecchioli, *The Internationalisation of Banking: The Policy Issues* (Paris: Organization for Economic Cooperation and Development, 1983), p. 16.

[2] Ibid., p. 19.

[3] Ibid., p. 17.

[4] Ibid.

[5] Ibid., p. 28.

[6] Pecchioli, op. cit., p. 28.

have a position of slightly less importance in international funding, although recently their importance has grown. Generally FRNs allow banks to secure funds for longer terms than those available through the deposit market.[7]

A unique aspect of international funding, however, is the reliance on interbank deposits as a major source of funds. Although it is difficult to measure, the interbank market is by far the largest source of international funding. Recent estimates place this market between two-thirds and three-quarters of total external and eurocurrency liabilities of reporting banks, or close to U.S. $1,000 billion.[8] What is not reflected in these figures is that the volume of trading is very heavy, reaching the proportions of the foreign exchange markets. The effects of information and communication technologies can be readily observed in this area. They are reflected in the high velocity and volume of trading, as well as in the participation in the wholesale market of many smaller, nonmoney center banks.[9]

International Lending

During the 1970's there was a rise in the willingness of private banks to finance development projects. Much of this came about as a result of the inability of domestic markets to absorb excess capital. Recently, the multilateral lending agencies, in particular the World Bank, have announced cofinancing projects, in which private banks are allowed to participate. These projects are thought to appeal to smaller banks, which value the ability of the World Bank to assess the viability of development projects.

Innovations have also occurred in the flexibility of the structure of the loaned funds, as well as in the markets approached. As banks' international assets have increased, their approaches to the marketplace have changed. The most evident of these changes is in the development of international credits through loan syndication.

Syndicated lending is the process by which very large amounts of funds are raised by allowing the participation of a number of banks. The benefit to the borrower is that these funds can be raised through a single operation. The benefit to the lender is that risk is spread among many banks, and institutions that could not undertake such a loan on their own can participate.[10]

The current "international debt crisis," where developing countries are unable to repay their loans to developed nations, has brought generally into question the risk of international lending and, specifically, the role of syndicated lending in exposing a greater number of institutions to risk. It became clear that smaller banks were becoming involved in international lending. It is not possible to address, in the scope of this report, the issue of the possible mismatching of liabilities and assets that can occur as a result of loan syndication and the subsequent risk and foreign loan exposure. Instead, the extent to which communication and information technologies contribute to the situation should be noted.

Technologies affect the ease with which banks can become involved in international lending. These same technologies may also help in better monitoring and control of international debt and repayment, helping to overcome the international destabilizing effects of a major default. In response to the severity of the situation, and the possibility of major-country loan defaults, a number of large multinational banks established the Institute of International Finance. The purpose of the institute is to provide valuable risk information about countries to member banks that are making loan decisions. The information is provided to members via an institutional network, using international telecommunication 1ines.

Multinational Banking

Multinational banking can be loosely defined as the branching abroad of banks. Multinational banking cannot be completely sep-

[7] Ibid.
[8] Ibid, pp. 29-30.
[9] Pecchioli, op. cit., p. 29; J. R. S. Revell, Banking *and Electronic Funds Transfers,* date, p. 156.
[10] Pecchioli, op. cit., p. 32.

arated from the international activities of banks. (Much of what is described in the previous sections can and does take place in branches of U.S. banks located outside of this country.) Multinational banking developed concurrently with international banking, but has different causal factors.

The first movement of banks to set up branches in foreign countries was generally in support of multinational corporate activities. As trade became more important and these activities increased in the 1960's, banks found it necessary to follow their clients abroad. Eventually, international banking grew and national economies and money markets became intertwined, and the banking community realized that its physical presence was necessary to secure and maintain market share as well as to participate in the developing financial markets abroad.

During the past two decades this activity has increased considerably. The number of overseas branches and agencies on a worldwide basis increased from 112 banks with 4,390 branches in 1961 to 387 banks with 4,329 branches in 1978. "

Methods of participation in foreign markets include everything from full-service branches to the establishment of "shell branches, " which are booking offices located in foreign countries that do not administer the business carried on their books and have no contact with the local market. Each method has its benefits, depending on the motivation of the parent institution.

[11]Pecchioli, op. cit., p. 59. Pecchioli explains the seeming contradiction between the claim that multinational banking activity increased and the actual number of overseas branches decreased. "In fact the decline in the number of total branches between 1961 and 1978 is an 'artificial' one in that it reflects a sharp decline of branches of European banks (United Kingdom and French banks in particular) in African and a few Asian countries which, following a policy of indigenisation motivated by economic nationalism, introduced restrictive legislation and induced takeovers by nationals during the period under review . . . [T]his policy led parent banks to change the form of their presence in these countries from branches to affiliates. If branches in these countries are excluded from the total, the size of the global network more than doubled in the period under consideration.

Offshore Banking

Offshore banking is any banking activity within a country's borders, but outside its banking system. There is considerable debate as to exactly which nations of the world should be considered offshore centers. For example, the City of London provides favorable conditions for off-shore banking, although it would not be a conventional member of the group considered off-shore centers. The United States first permitted the development of international banking facilities (IBFs) in December 1981 in an attempt to bring back much of the Euromarket business, which had fled this country due to State tax laws and Regulation D. IBFs are banks located in the United States, but because of the nature of their business are not subject to some of the regulations under which banks operate domestically. Both U.S. banks and foreign banks operating in this country can establish IBFs. They are established through State and local laws and amendments to Regulations D and Q and are similar to an off-shore "shell" branch that operates on-shore.

The development of off-shore banking centers is facilitated by information technologies, which tend to make the industry less location-sensitive. Nations have developed a sophisticated communication system solely for the support of the financial service industry. This can encourage further migration of the players out of more regulated environments, which in turn makes it extremely difficult for the U.S. Government to implement policy and to control the flow of funds in the United States.

U.S. Branching Abroad

The movement of U.S. banks abroad coincided with the multinationalization of American corporations. However, there were added incentives for U.S. banks to go multinational that were perhaps not evident in other nations, in particular domestic, a regulatory structure that restricted U.S. banks from branching outside of a limited geographic area and limited their potential market share in the United States.

Foreign Banks in the United States

The number of branches and agencies of foreign banks in the United States increased from 34 in 1961 to 241 in 1978 and to 452 in 1983. [12]

Until 1978, foreign bank branches in the United States were treated very differently under the regulatory structure than were U.S. bank branches. With the International Banking Act of 1978 much of the so-called discrimination against U.S. banks in their home market was done away with. There is still some contention that the system does not treat U.S. and foreign banks totally equally, but for the most part, foreign banks must abide by the same regulations as U.S. banks.

[12] Pecchioli, op. cit., p, 59; (1961 and 1978) Federal Reserve Board of Governors. 1983.

Financial Markets

Money Markets

Perhaps the most remarkable growth in bank use of foreign money markets as sources of funds in the last 20 years occurred in the eurocurrency markets,

> Banks' rapidly growing involvement in euro-market business was largely by response to two basic elements: perception of the profit opportunities arising from differential regulatory provisions applying to international and domestic business and increased reliance on portfolio diversification as a means for reducing risk exposure. Over the years, an additional stimulus to the expansion of eurocurrency transactions was provided by the growing familiarity of customers, both depositors and borrowers, with the peculiar techniques of foreign currency operations and particularly by the proved depth and resiliency of the interbank markets in foreign currencies. [13]

The eurocurrency market provided banks in countries with undeveloped money markets the opportunity to enhance the management of their liquidity. The development of sophisticated interbank communication techniques also had a significant effect on the ability of banks to participate in these markets.

Flexible exchange rates have enhanced the acceptability of the eurocurrency markets as "substitutes' for the foreign exchange market with respect to hedging.

[13] Pecchioli, op. cit., pp. 19-20.

International Financial Information Systems

Computer-based business information systems are finding widespread application in the financial service industry, particularly in international finance. A major figure in this area is Reuters, the world's oldest international news agency. Reuters Monitor provides information on worldwide money markets to financial institutions via 15,000 terminals in *74* countries. [14] By far the leader in this service, Reuters competes with other nonbank financial data providers in the United States and abroad, as well as with the information services of financial institutions. The Reuters service is unique in that, as a videotex system, it also provides the opportunity for the user to deal in the markets and may eventually allow the user to confirm and complete deals using a terminal.

The information provided in these systems has always been available, it was just not readily accessible. In the case of the money markets, the information provided by these services was not previously available in one place. Often these services provided additional, useful information or information that could be found elsewhere in newspapers or reports. However, what was once useful is now essential information, providing a competitive edge to its user. This in turn has forced most

[14] Paul Walton, "A Boon for the Money Markets, " *Financial Times,* Dec. 14, 1983, p. 28.

institutions wishing to be competitive to use the systems. Technology has provided the catalyst for the growth of these systems.

An annoying side-effect of these systems is the proliferation of terminals and the incompatibility of systems. A dealer, in order to have access to a variety of information sources, may need four or five different terminals. This situation is bound to right itself in the long run, either by each organization's having a centralized information function that feeds into its own data system, or by existing vendors offering their services on compatible systems.

International Interbank Communications

Much of the international banking activity described in the preceding sections takes place via sophisticated international communication facilities. This is particularly true for interbank transfers of information and funds. As international banking has grown, so too has the importance of these functions. In recognition of this, many of the large, money-center banks formed private telecommunication networks to help ease some of the problems associated with massive paper flows. Interbank transfers are generally high-value transfers.

New York Clearing House Association

In 1970, the New York Clearing House Association began operating the Clearing House Interbank Payments System (CHIPS). CHIPS was founded to help meet the need perceived by a few of the large New York money-center banks for an automated system. Since its inception, CHIPS has been almost entirely automated, although for a short period in the beginning some of the clearing was paper-based. Although CHIPS has not stated any intention of expanding geographically, it is responsible for moving among banks an estimated 90 percent of the U.S. dollars exchanged in international commerce.[15]

Society for Worldwide Interbank Financial Telecommunication

SWIFT, founded in 1973 and operational in 1977, is the largest of the international financial telecommunication networks. SWIFT is not a financial organization nor a telecommunication common carrier; instead, it is a nonprofit cooperative society that links member banks worldwide through a data processing and transmission network. SWIFT owns and operates its own processing facilities and leases communication lines from national or international carriers.

SWIFT was initiated by a group of European bankers who were searching for a better way than mail or telex to transmit messages to correspondent banks. In response to the increase in international financial volume in the 1950's and 1960's, a number of banks had established internal communication and processing systems. These proprietary systems usually connected only branches and affiliates of the banking groups, and therefore transactions involving a number of banks would often rely on a paper-based system. Another drawback of these proprietary systems was that they established a myriad of standards, comparable to the different gauges of railroad track one still encounters when crossing some national boundaries. The creation of SWIFT was in response to the need to establish a rapid communication and processing system, which was universal and standardized, was for all international interbank transfers and was available to all banks. SWIFT was also seen as a way to compete with these intrabank communication systems, particularly those of large U.S. banks but eventually also a number of smaller U.S. banks, in order to provide the volume necessary to support the system.

[15] "CHIPS: More Than Just a Clearing System," *Transition*, February 1983, p. 20.

When SWIFT was incorporated in Belgium in 1973, it was owned by 239 European, North American, and Japanese banks in 15 countries. In its first year of operation, SWIFT averaged 51,700 transactions per day. " As of April 1983, the SWIFT system served 1,063 member banks in 52 countries, of which 33 were operational countries, and processed an average of 360,000 financial transactions per day (see figs. 12 and 13).[17] This represents about four times the combined total transactions of the two private sector bank payment networks in the United States, Bankwire and CHIPS. [18] SWIFT is not a clearing or settling network and does not read the messages as they pass through the system; therefore, the value of these transactions is difficult to determine.

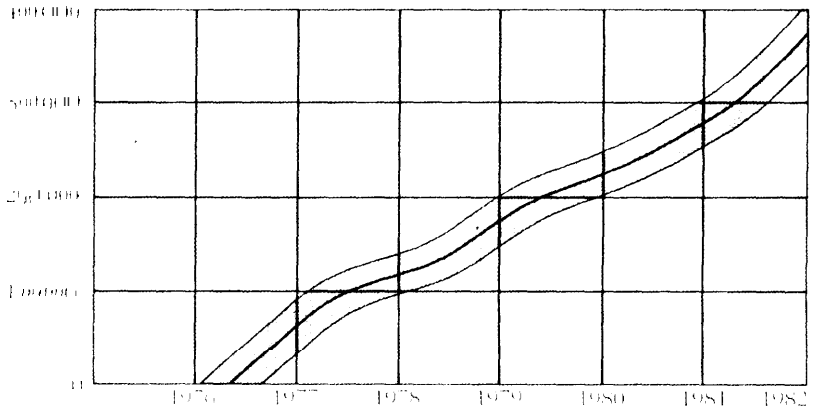
[16] *SWIFT: Ten Years,* special anniversary issue of the general introductory brochure (Brussels, Belgium: Society for Worldwide Interbank Financial Telecommunication, May 1983), p. 25.

[17] SWIFT, "Facts About SWIFT, '4 April 1983.
[18] "Executive Suite, " *Transition,* January 1983, p. 2.

Figure 12.— Daily System Traffic Volumes (average: **end of year)**

DAILY SYSTEM TRAFFIC VOLUMES (AVERAGE END OF YEAR)

1977	51 700
1978	121 500
1979	164.200
1980	218 700
1981	285.000
1982	340 300

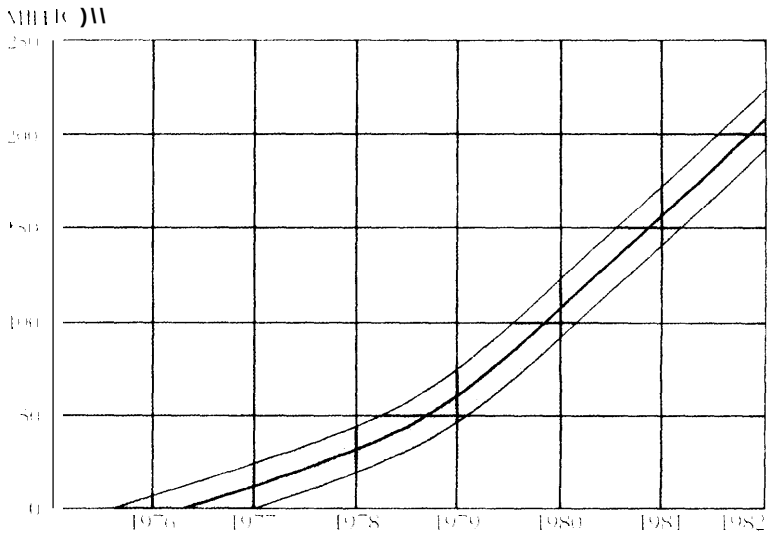


SOURCE *SWIFT Ten Years* special anniversary issue of the general Introductory brochure (Brussels Belgium Society for Worldwide Interbank Financial Telecommunication May 1983)

Figure 13.—Cumulative System Volumes (end of year)

CUMULATIVE SYSTEM VOLUMES (END OF YEAR)

1977	3.373.100
1978	24 751 200
1979	59.330.000
1980	106 500 000
1981	169.081 000
1982	248.609.400



SOURCE *SWIFT Ten Years* special anniversary Issue of the general Introductory brochure (Brussels Belgium Society for Worldwide Interbank Financial Telecommunication May 1983)

U.S. traffic over the network is higher than that of any other nation; in 1982 it was 17.7 percent of total volume, an increase from the 1981 figure of 16 percent.[19] Yet only 141 U.S. banks participate in the system. Carl Reuterskiold, SWIFT's general manager, estimates "that as many as 500 U.S. banks are involved sufficiently in international banking to merit SWIFT membership. "[20]

After 6 years of operation SWIFT is entering a new phase of operation. In 1982 it was able to amortize completely the development costs of the network, and for the first year, broke even. This has occurred even though SWIFT raised the basic per-message charge only once, to 18 Belgian francs (about 35 to 40 U.S. cents) .21

SWIFT's plans for expansion include an improvement in technical transmission and processing facilities, commonly called SWIFT II. Plans are to install a new, more powerful computer system between 1985 and 1987 on a country-by-country basis. SWIFT will finance the new system internally from operating revenues.

Although SWIFT enjoys a comfortable position as the primary international financial transmission network in terms of volume, it has continued to seek new business opportunities. By September 1983, SWIFT estimated that it offered its base service to approximately 90 percent of the total international financial market.[22] SWIFT management foresees a leveling off of revenue in this business area and therefore plans to expand its revenue producing message traffic in other areas. In 1982, SWIFT formed direct interface with the CEDEL and Euroclear bond clearing systems and MasterCard International to use SWIFT for transmission of transaction or settlement information.

SWIFT has also begun a controversial new program to offer new financial services, specifically balance reporting. Many U.S. banks view the proposed changes as potential competition for services that banks currently offer. However, if balance reporting does not lead to other types of cash management services, these banks will not challenge SWIFT's entry into this business area. SWIFT management maintains that the balance reporting service will be invisible to corporations and will remain an interbank service. There is evidence that although U.S. banks may be wary of the changes, European banks may be encouraging the implementation of these new services.

Another service that SWIFT management intends to expand is the provision of intra-*country* financial communications.

One of the primary achievements of SWIFT for international banking has been the standardization of international, interbank communications. With respect to new services, SWIFT intends to play the same role, thereby helping to establish international standards in cash management services,

[18] Robert Trigaux, "SWIFT Executives and Bankers Mull the System's Future," *American Banker, New* York, May 17, 1983, p. 1.

[19] Ibid., p. 31.

[21] Ibid., p. 31.

[22] B. Kok, "The Business Future, " *Proceedings From SWIFT International Banking Seminar (SIBOS '83),* Sept. 26-30, 1983, Montreux, Switzerland, p. 12.

The Effect of Technology on International Payment Systems

J. R. S. Revell distinguishes between two classes of payments in his work, *Banking and Electronic Funds Transfers.*[23] Borrowing from the work of J. M. Keynes, Revell separates international financial flows into two categories: those involving the transfer of income and the payment for goods and services by nonfinancial business and households, or the "industrial circulation" (corporate and retail payments), and those involving foreign exchange, the money market, and the capital market, or "financial circulations. " It is a useful distinction when one is concerned with the impact of the technology on payment flows, for it would appear that certain characteristics of information technology will have different effects on the different types of flow. By using these two classifications, the specific impacts of the technology can be defined more clearly.

Information technologies have had a great impact on operations in both areas. The mechanisms of these markets have been described in previous sections. What follows are specific examples of the effect of technology on the two types of flows. In retail and corporate markets, the technologies have led to a range of new, technology-based products, adding to the choices available to the individual and corporation in international financial transactions. In financial markets the technologies have primarily affected the velocity and volume of transactions.

Corporate and Retail Markets

In many of the normal payments associated with trade, it is not speed of transaction which is of importance. Since trade payments are scheduled for particular days each month, the settlement of accounts could easily continue to be handled by mail, taking the delay into account. However, electronic payments add some control over these payments, and by their nature handle increased volume of payments much better than paper-based systems.

One of the distinguishing characteristics of the international market is that, as in the domestic market, corporate customers demand cash management services from financial service providers. The basic principle of these services is to maintain low operational balances, with the majority of funds invested and earning interest. The impact of communication and information technologies on the ability of a corporation to manage its financial position is similar to that in the domestic market; i.e., the manager is able to react immediately to information and to adjust the corporate financial position accordingly. The difference in the international market is that these transfers take place in multiple currencies and cross many international boundaries. For the multinational corporation, foreign exchange fluctuations provide a great incentive for initiating electronic transfers. The technology allows the user to react instantaneously, often protecting the corporation from foreign exchange losses in times of economic turbulence.

Another difference from the domestic marketplace that affects the complexity of international cash management is that the manager must rely on information from a multiplicity of sources in dispersed places, to the point where flows of information are beginning to rival payment flows in importance. It is easy to reach Revell's conclusion that, "The ultimate objective is that the corporate treasurer at head office shall have an up-to-the-minute summary of the cash position in all currencies on a single VDU [video display unit] on his desk; he will then initiate the larger transfers of funds himself, leaving the bank computer to invest smaller amounts according to routines decided in advance. "[24]

[23] Revell, op. *Cit., p. 154.*

[24] Ibid., p. 155.

Technological Innovation in Retail Services

Since many innovations in corporate and retail flow of funds often take place in the international side first, it is useful to study what is going on in the international marketplace to help project developments in the domestic arena.

One of the distinct differences between technological innovation in the U.S. financial service industry and that in foreign nations is the level of government subsidy of technical developments that affect the financial service industry. For example, the smart card, the applications and functions of which are discussed in chapter 2, was developed by the French Ministry of Post and Telecommunications (PTT). Although the card has other uses, it will be used for electronic banking, particularly for payments. The French have also conducted various trials in point-of-sale (POS) systems and have also introduced on a limited scale a videotex system that will eventually be capable of handling financial transactions. The charge for this service is provided to the consumer as part of his monthly telephone charge. The British videotex system, Prestel, was developed by British Telecom (BT, then part of the British Post Office), the telecommunications authority. Again, although the system has other applications, its service is in direct competition with other, commercially developed systems.

The developments outside the United States with respect to retail services are in many ways similar to the domestic innovations that have been described in previous sections. What differs in many cases is not the technology itself, but the commitment of the various governments and the structure of the financial service industry in a particular nation. Often, technological innovations are easier to implement under a regulatory structure that differs from the U.S. regulatory structure. For example, in Great Britain, BT and IBM are currently discussing an electronic POS system with the London clearing banks. Since the banking industry in Great Britain is highly concentrated, agreement with these banks (and assuming subsequent agreement with British retailers) will ensure a national POS system.

Some innovation in retail services takes place across national borders. Members of Eurocheque International recently agreed on a “eurocheque” ATM standard that will allow the crossborder use of the eurocheque guarantee card. VISA International plans a similar service on a worldwide basis. The impetus for much of this activity has been the growth of international travel and the consequent need by the traveler for ready access to bank accounts worldwide.

Vulnerability of the Financial System

The application of advanced financial information technologies occurs in nearly all industrialized nations and in many of the newly industrializing nations. This is in response to, and will further enhance, the ongoing growth of global economic activity and the increasing interdependence of national currencies, national markets, and national economic policies.

Expanding world trade, which is responsible to a great extent for this financial activity, is increasingly important to the U.S. economy. World trade relies heavily on the integrity of transnational transactions and payments; this in turn depends heavily on the reliability and security of the transborder flow of data.

As world trade has expanded, so too have the financial services to support it, not only in the actual support of trade through traditional bank lending and transfer mechanisms, but also in the provision of flexible money and capital markets. The use of new technologies in the financial service industry has facilitated

the growth in volume of financial flows separate from but related to the payment flows associated with world trade. One aspect of these money and capital markets is the interbank transfer. The application of information technologies permits both the increased volume of these transfers and the participation of smaller, nonmoney center banks, thus helping change the character and structure of international banking.

Security and Integrity of the Financial System

Communication and information technologies have increased the interdependency of the participants within the financial system. The international financial system may now be more vulnerable than ever to upheaval, both economic and political, in foreign countries. At issue within this area is the question of the increased vulnerability of all parties to international events that results from communication and information technologies.

The technologies have created new opportunities for attacking systems for delivering financial services. System integrity, the ability of a system to recover from damage, is a salient issue when a significant portion of the required operations are performed without human intervention. For example, financial service institutions can be attacked by perpetrators electronically and off-site. Some systems have reached a stage of complexity where they can be backed up only with automated systems, and in the case of interruption to service, they can be restored to operation only with automated recovery procedures.

Error Resolution in International Electronic Funds Transfer

With increasing global interdependence and increasingly complex transactions, generally more than two parties are involved in a single transaction, and therefore a multitude of systems are also involved. The issue as defined here is that of responsibility in the case of loss or error. Simple bilateral contracts do not in all cases clearly place liability, especially when transactions involve multiple parties. It has been recommended that the party initiating the transaction be responsible, which is not acceptable to all parties.

There is a similarity between losses suffered under CHIPS or SWIFT and those under other payment systems. They can be classified in three ways: principal losses, interest losses, and losses resulting from foreign exchange fluctuations. "These losses may be caused by the delay of a transmission, the introduction of faulty information, or a participant's inability to settle the day's transactions. Delays and faulty information may arise from hardware and software failure, mistakes by personnel involved in processing the transaction, and fraud. The failure to settle, on the other hand, is usually caused by the failure of one of the transferring banks. "[25]

Foreign Telecommunications and Information Policies

Although the force from within the industry is toward the flow of information throughout the world, integration of the world economy and the world financial system is by no means as simple as the integration of a domestic economy. Currencies, accounting methodology, and regulatory and supervisory structure all differ among nations. In support of trade activity, information flows across national boundaries: information which includes both personal and strictly financial data, information which travels via sophisticated telecommunications systems, and information processed by state-of-the-art technologies. These flows, known as transborder data flows (TBDF), have caused conflict and controversy among nations and between particular nations and multinational businesses. It is primarily the informational flows, rather than payment flows, with which most nations are ostensibly concerned.

[25] Herbert F. Lingl, "Risk Allocation in International Interbank Electronic Fund Transfers: CHIPS and SW1 FT," *Harvard International Law Journal*, vol. 22, No. 3, fall 1981, pp. 630-631.

Sovereign nations assert legitimate reasons for, and a right to, monitor and control TBDF. Primary among these reasons are protection of the privacy of their citizens, industrial development, and national security. However, sovereign rights and national information policy are frequently in direct conflict with the interests of large, multinational organizations, including financial service providers. This conflict of interest in turn can impede the progress of a global financial system and perhaps world trade.

As the information technology industry becomes increasingly important in international trade, more countries are seeking to protect their indigenous communication and information industries and are therefore creating legal barriers to the flow of information. This has an impact on the financial service industry, whose primary function is the distribution and processing of information.

The requirements of multinational and international finance include rapid communications and efficient data processing. Certain restrictions by foreign governments—e.g., that all data are processed locally-can severely hamper these activities. The current economies of data processing are such that it is more efficient to centralize the process.

For a variety of reasons, there have been suggestions that nations limit the flow of personal data across their borders. Some would limit the effects of restrictions to data identifiable with natural persons while others would include both natural and legal persons. Included has been the suggestion that limitations on TBDF be focused on curtailing the flow of data to nations that have not imposed privacy standards at a level consistent with those of the nation imposing them. However, much of the data of interest to the financial service industry pertains to specific individuals, and its movement across international borders would be affected by such restrictions. Therefore, limitations on TBDF could cause significant problems for the financial service industry, which finds demands for international services increasing.

The economic and industrial development justification of restrictions of TBDF have as their impetus the rising importance of information and communication technologies to the world economy. As traditional manufacturing industries stagnate and high-technology information industries grow, it is to every nation's advantage to encourage a sound, strong information industry. Although national policy strategies differ, it is evident that some nations have taken the route of protectionism. For example, Brazil has stringent requirements on the import of data processing equipment in order to encourage the growth of local industry. Until recently, little foreign competition was allowed in the large Japanese communications and information technology and services market. These types of activities, although they may protect indigenous industry, have a tendency to increase overall costs to users.

More specifically affecting the financial service industry are those national policies that threaten to discontinue access to leased lines, begin usage-sensitive pricing schemes, and demand that industry use local communication facilities. The objections of banks and other financial service providers is not only that this will increase their costs, but that transmittals over public lines make control over sensitive information more difficult.

National security concerns seem to center around the economies of scale and the lack of locational sensitivity in data processing. It is common for large corporations to center their processing facilities in one nation. For example, SWIFT's data processing and transmission centers for its 52 member countries are located in 3 countries: the Netherlands, Belgium, and the United States. Such centralization engenders the fear that sensitive information will be stored in a foreign country, or that a nation may be cut off from information in a time of national crisis. As SWIFT pursues domestic interbank markets, these fears become well-founded; it is entirely possible for one nation's domestic retail and interbank financial information to be stored at facilities outside its borders.